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SECTION IIREMARKSRegarding the Amendments

Claims 1, 7, 15, and 22 have been amended as set forth in the above Complete Listing of the Claims. As amended, the claims are supported by the specification and the original claims and do not add new matter, as defined by 35 U.S.C. § 132. The amendments do not require a new search, or raise new issues for consideration because they merely address issues already raised by the examiner or define applicants' invention more clearly. It is submitted that the amendments place the claims in condition for allowance or in better condition for appeal by reducing the number of issues for consideration on appeal. The amendments were not made earlier in the prosecution because it is maintained that the previously pending claims were allowable. Since the amendments do not add new matter or require a new search or consideration, and place the claims in condition for allowance or in better condition for appeal, entry of the amendment is respectfully requested.

Thus, upon entry of the amendments, claims 1-5 and 7-31 will be pending, of which claims 1-5, 12, 14-21, 27, and 29 are withdrawn.

Rejection of Claims 7-11, 22-26, 30 and 31 Under 35 U.S.C. §103

The examiner has maintained and modified the rejection of claims 7-11, 22-26, 30 and 31 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,872,681 (hereinafter "Niu et al.") in view of Mamedov et al., Nature Materials 1:190-194, 2002 (hereinafter "Mamedov et al."), as presented in the Office Action mailed December 19, 2006.

It is elemental law that in order for an invention to be obvious, the difference between the subject matter of the application and the prior art must be such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the art. In order to meet this standard for a proper §103 rejection, all claim limitations must be disclosed or derivable from the cited combination of references, there must be a logical reason to combine the cited references to produce an operable combination and there must be a reasonable expectation of success. See MPEP §2143:

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**"2143 Basic Requirements of a Prima Facie Case of Obviousness**

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

"The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

The examiner's attention is respectfully drawn to the amended claim language of pending, independent claims 7 and 22. As amended, each claim recites a CNT film or pattern consisting essentially of laminated CNT layers, prepared by the recited method steps. It is well established that "[t]he transitional phrase 'consisting essentially of' limits the scope of a claim to the specified materials or steps 'and those that do not materially affect the basic and novel characteristic(s)' of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original)." MPEP §2111.03.

As amended, independent claims 7 and 22 of the invention require a CNT film, pattern or biochip prepared by the recited essential steps. By the recited steps, the resulting CNT film, pattern or biochip mounted on a substrate consists essentially of CNT layers, where the top layer has exposed functional groups, capable of further reaction. Such layers of CNT are linked by various linkers, including peptide linkages. However, the essential elements are the CNT layers. In assembling such film, pattern or biochip, the substrate must have exposed amine groups that react directly with the carboxylated CNTs. The exposed carboxylated groups are then reacted with an organic diamine, in order to prepare the CNT layer for reaction with an additional CNT layer. By sequential CNT layering and amidation, the resulting CNT film, pattern or biochip consists essentially of CNT layers.

Niu et al. in light of Mamedov et al. fail to provide any derivative basis for the claimed invention, as Niu et al. in light of Mamedov et al. does not describe a CNT film, pattern or biochip as recited in the claims of the present application. Accordingly, no basis of *prima facie* obviousness of the claimed invention is presented by such cited references.

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It is acknowledged that Niu et al. teach carboxylated CNTs, as cited by the Examiner. However, Niu et al. does not describe formation of CNT layered structures on a substrate. Niu et al. viewed in light of Mamedov et al. does not remedy the above deficiencies.

With regard to pending, independent claims 7 and 22, Niu et al. in light of Mamedov et al. do not describe a CNT film, pattern or biochip consisting essentially of layers of CNT. Mamedov et al., in teaching a layered film, utilizes layers of PEI and PAA in combination with carboxylated CNTs. Even if the protein derivatized nanotubes of Niu et al. were utilized in the layered film of Mamedov et al., such a resulting film would still require PEI and PAA. PEI and PAA are necessary to the film of Mamedov et al., as stated on page 191, second full paragraph, in order to "improve the linearity of the deposition process and present a convenient chemical anchor for subsequent modification." The present invention, by modification of the exposed carboxyl groups directly on a CNT to amines and binding to a subsequent carboxylated CNT eliminates the need for such linearity improvement and "chemical anchors" and thus provides an improvement over a layered composition provided by Niu et al. in light of Mamedov et al.

As Niu et al. in light of Mamedov et al. does not provide any logical basis for the CNTs recited in claims 7-11, 22-26, 30 and 31, Niu et al. in light of Mamedov et al. does not render the claimed invention obvious. Accordingly, withdrawal of the rejection of claims 7-11, 22-26, 30 and 31 under 35 U.S.C. § 103 (a) as being obvious over Niu et al. in light of Mamedov et al. is respectfully requested.

#### **Rejection of Claims 7-11, 13, 22-26 and 28 Under 35 U.S.C. §112**

The Examiner has rejected claims 7-11, 13, 22-26 and 28 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. Specifically, the examiner alleges that the amendments made to the claims in the Response filed April 11, 2007 contains claim language not sufficiently described in the application. Applicants respectfully disagree.

The examiner first rejected removal of the language "and has a carboxyl group exposed on its surface" from claim 7, alleging that such amendment results in a claim to a CNT with "a top layer without chemical functionality..." Applicants respectfully disagree. Claim 7 was amended to independent form, by incorporating the subject matter of withdrawn claim 1. The amendment to claim 7 did not change the scope of that claim. The CNT of amended claim 7 still contains a

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CNT with chemical functionality. The concluding language of the claim is "...thereby forming a high density CNT film or pattern having exposed carboxyl groups." Accordingly, claim 7, as pending, recites a CNT prepared by the recited method, resulting in a CNT with exposed carboxyl groups.

The laminating reaction recited as forming the CNT of claim 7 is illustrated in Figure 1 of the application. In that figure, it can be seen that a substrate with amine groups on its surface is reacted with a CNT single layer having exposed carboxyl groups on both sides, to form a single layer CNT on the substrate:

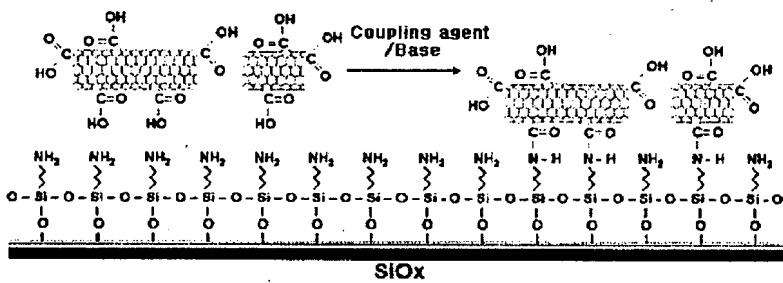


Figure 1(a)

Subsequent reaction of the exposed carboxyl group with amine groups and reaction with another CNT layer with exposed carboxyl groups results in two laminate layers of CNT, the top layer of which has exposed carboxyl groups:

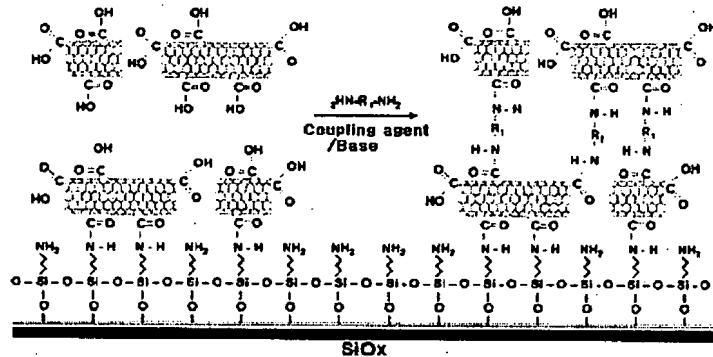


Figure 1(b)

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Repetition of this reaction results in multiple laminate layers of CNT, with the top layer having exposed carboxyl groups, as claimed in claim 7. Withdrawal of the rejection of claim 7 and claims 8-11 and 13 dependent therefrom, is therefore respectfully requested.

Additionally, the examiner rejected claim 22, claims 23-26 and claim 28, stating that amendment of the language therein to include "plural different chemical functional groups" is not supported by the specification.

The examiner's attention is respectfully directed to amended claim 22. As amended, the final section of claim 22 recites:

"...wherein the high density CNT film or pattern has exposed chemical functional groups on its surface, in which the chemical functional groups are any one selected from the group consisting of amine groups, aldehyde groups, hydroxyl groups, thiol groups and halogens."

The language "any one" preceding the group of exposed functional groups clarifies that the high density CNT film or pattern of claim 22 has only one kind of chemical functional group and does not possess plural different chemical functional groups. As amended, claim 22 clearly recites a high density CNT film or pattern which has plural chemical functional groups which are the same.

Withdrawal of the rejection of claim 22 and claims 23-26 and claim 28 dependent therefrom, is therefore respectfully requested.

### CONCLUSION

Based on the foregoing, all of Applicants' pending claims 1-5 and 7-31 are patentably distinguished over the art, and are in form and condition for allowance. The Examiner is requested to favorably consider the foregoing and to responsively issue a Notice of Allowance.

The time for responding to the July 16, 2007 Office Action without extension was set at three months, or October 16, 2007. This response is therefore timely and no fees are believed to be due for the filing of this paper. However, this Amendment and Response is being filed with a Request for Continued Examination, the fee for which is \$395.00, as applicable to small entity. Such fee is authorized by the enclosed Credit Card Payment Form PTO-2038. Should any

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additional fees be required or an overpayment of fees made, please debit or credit our Deposit Account No. 08-3284, as necessary.

If any issues require further resolution, the Examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss same.

Respectfully submitted,

Date: Oct. 16, 2007

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**Enclosures:**

**RCE Transmittal [1 page]**  
**Credit Card Payment Form PTO-2038 [1 page]**

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